

## **AMENDMENTS TO THE CLAIMS**

The following listing of claims will replace all prior versions and listings of claims in the application.

### **LISTING OF CLAIMS**

1. (Currently Amended) A constraint-based speech recognition system for use with a form-filling application employed over a telephone system, the system comprising:

an input signal comprising:

a) speech input, and  
b) non-speech input of a type generated by a user via a manually operated device;

a constraint module operable to:

a) access an information database containing information suitable for use with speech recognition, wherein the information database is a hierarchical data structure of short lists of speech recognition candidates, the shortlists being hierarchically arranged according to pre-defined classes that can be entered via the non-speech input, and

b) generate candidate information based on the non-speech input and the information database, the candidate information corresponding to a portion of the information, wherein said constraint module requires entry by a user of only so many classes via the non-speech input as required to provide sufficient constraint for speech recognition in accordance with at least one of: (a) a maximum amount of the candidate

information; or (b) a maximum measure of confusability between candidates of the candidate information; and

a speech recognition module operable to recognize speech based on the speech input and the candidate information.

2. (Original) The system of claim 1, wherein the manually operated device defines a plurality of classes, and wherein the information database is encoded according to the plurality of classes.

3. (Original) The system of claim 1, wherein the information is further defined to be suitable for populating a form data structure accessible to the form-filling application.

4. (Original) The system of claim 1, wherein the manually operated device is further defined as a keypad of the type used with a touch-tone telephone, and wherein the non-speech input is further defined as user-generated tones.

5. (Original) The system of claim 4, wherein the keypad defines a plurality of classes, and wherein said information database is encoded according to the plurality of classes.

6. (Original) The system of claim 5, wherein at least one class associated with the plurality of classes is further defined to be a number-letter combination corresponding to a combination of letters and a number visually represented on the keypad as associated with a key of the keypad.

7. (Original) The system of claim 6, wherein the information is further defined to be at least one of:

- a) names, and
- b) addresses, and

wherein the information database is further defined to be at least one of:

- a) encoded according to combinations of letters based on the key classes, the combinations potentially representative of names, and
- b) encoded according to zip codes associated with the addresses.

8. (Currently Amended) A constraint-based speech recognition method for use with a form-filling application at a telephone, the method comprising:

receiving an input signal, the signal comprising speech input and non-speech input, the non-speech input of a type generated by a user via a manually operated device;

accessing an information database containing information suitable for use with speech recognition, wherein the information database is a hierarchical data structure of short lists of speech recognition candidates, the shortlists being hierarchically arranged according to pre-defined classes that can be entered via the non-speech input;

generating candidate information based on the non-speech input, the candidate information corresponding to a portion of the information, including requiring entry by a user of only so many classes contained in said non-speech input as required to provide sufficient constraint for speech recognition in accordance with at least one of: (a) a maximum amount of the candidate information; or (b) a maximum measure of confusability between candidates of the candidate information; and

recognizing speech based on the speech input and the candidate information.

9. (Original) The method of claim 8, wherein the manually operated device defines a plurality of classes, and wherein the information database is encoded according to the plurality of classes.

10. (Original) The system of claim 8, wherein the information is further defined to be suitable for populating a form data structure accessible to the form-filling application.

11. (Original) The method of claim 8, wherein the manually operated device is further defined as a keypad of a type used with a touch-tone telephone, and wherein the non-speech input is further defined as user-generated tones.

12. (Original) The method of claim 11, wherein the keypad defines a plurality of classes, and wherein said information database is encoded according to the plurality of classes.

13. (Original) The method of claim 12, wherein at least one class associated with the plurality of classes is further defined to be a number-letter combination corresponding to a combination of letters and a number visually represented on the keypad as associated with a key of the keypad.

14. (Original) The method of claim 13, wherein the information is further defined to be at least one of:

- a) names, and
- b) addresses, and

wherein the information database is further defined to be at least one of:

- a) encoded according to combinations of letters based on the key classes, the combinations potentially representative of names, and
- b) encoded according to zip codes associated with the addresses.

15. (Cancelled)

16. (Cancelled)

17. (Currently Amended) A method of constraint for use with a speech recognition system, the method comprising:

receiving an input signal, the signal comprising non-speech input of the type generated by a user via a keypad of the type used with a touch-tone telephone;

accessing an information database containing searchable information, wherein the information database is a hierarchical data structure of short lists of speech recognition candidates, the shortlists being hierarchically arranged according to pre-defined classes that can be entered via the non-speech input; and

generating candidate information based on the non-speech input, the candidate information corresponding to a portion of the searchable information, including requiring entry by a user of only so many classes contained in said non-speech input as required to provide sufficient constraint for speech recognition in accordance with at least one of: (a) a maximum amount of the candidate information; or (b) a maximum measure of confusability between candidates of the candidate information.

18. (New) The system of claim 1, wherein the amount of the candidate information is dictated by the measure of confusability on a lexicon storing pronunciation of each of a plurality of the speech recognition candidates in conjunction with its spelling.

19. (New) The system of claim 18, wherein said constraint module deems a shortlist of the speech recognition candidates as sufficiently constrained if each member of the short list differs in pronunciation from each other member of the shortlist by at least one phoneme.

20. (New) The system of claim 18, wherein said constraint module deems a shortlist of the speech recognition candidates as sufficiently constrained if a number of speech recognition candidates in the short list is below a predetermined threshold.